CLAIMS

Therefore the following is claimed:

1. A system for data communication, comprising:

a precoder state element configured to monitor a precoder state and to develop a series of precoder symbols;

an interleaver configured to receive and interleave the precoder symbols;

a trellis state element configured to receive the interleaved symbols and to develop a trellis state output; and

a trellis encoder configured to receive the trellis state output and to generate at least one redundant bit.

2. The system of claim 1, further comprising a feedback precoder configured to maintain the magnitude of a transmit signal at a predefined level, wherein the precoder state is a state of the feedback precoder.

3. The system of claim 2, wherein the precoder state defines changes in the transmit signal that occur as a result of feedback precoder actions.

4. The system of claim 1, wherein the interleaver is configured to store the precoder symbols in a first sequence, and the trellis state element is configured to receive the precoder symbols from the interleaver in a second sequence.

5. The system of claim 1, further comprising a constellation encoder configured to receive the redundant bit and at least one data bit and to generate a transmit signal based on the redundant bit and the data bit.

6. A method of data communication, comprising:

producing a series of precoder symbols;

interleaving the precoder symbols;

producing a trellis state output from the interleaved symbols; and

generating a redundant bit based upon the trellis state output.

7. The method of claim 6, further comprising maintaining the magnitude of a transmit signal at a predefined level.

8. The method of claim 7, wherein the precoder state defines changes in the transmit signal that occur as a result of maintaining the magnitude of the transmit signal.

9. The method of claim 6, further comprising:

storing the precoder symbols in a first sequence; and s

receiving the precoder symbols from the interleaver in a second sequence.

10. The method of claim 6, further comprising encoding a transmit signal using the redundant bit and at least one data bit.

11. A system for data communication, comprising:

means for producing a series of precoder symbols;

means for interleaving the precoder symbols;

means for producing a trellis state output from the interleaved symbols; and

means for generating a redundant bit based upon the trellis state output.

12. The system of claim 11, further comprising a means for maintaining the magnitude of a transmit signal at a predefined level.

13. The system of claim 12, wherein the precoder state defines changes in the transmit signal that occur as a result of actions by the means for maintaining the magnitude of the transmit signal.

14. The system of claim 11, further comprising:

means for storing the precoder symbols in a first sequence; and

means for receiving the precoder symbols from the interleaver in a second sequence.

15. The system of claim 11, further comprising means for encoding a transmit signal using the redundant bit and at least one data bit.

16. A system for data communication comprising:

a precoder configured to receive a first constellation associated with a trellis state and to produce a trellis symbol associated with the trellis state;

an interleaver configured to receive a first sequence of the trellis symbols and to produce a second sequence of the trellis symbols;

a trellis state decoder configured to receive the interleaved trellis symbols and to produce a trellis state for each of the interleaved symbols, where the trellis state is associated with the first constellation; and

a trellis encoder configured to receive the trellis state and to produce a redudant bit based on the trellis state.

17. The system of claim 16, further comprising:

a constellation encoder configured to produce the first constellation based on the redundant bit.

18.	The system of claim 16, wherein the precoder is further configured to produce a second constellation with altered power characteristics.

19.	A method for interleaving in a data communications system comprising the steps of:

generating a trellis symbol representing a trellis state of a first signal constellation;

interleaving a plurality of the trellis symbols;

determining the trellis state associated with each of the trellis symbols; and

trellis encoding based on the trellis state to produce a redundant bit.

20.	The method of claim 19, further comprising:

precoding the first signal constellation to produce a second signal constellation; and

transmitting the second signal constellation.

21.	The method of claim 19, wherein the interleaving step further comprises:

receiving the plurality of trellis symbols in a first sequence; and

producing a second sequence of the plurality of trellis symbols.

22.	The method of claim 19, wherein the determining step further comprises:

slicing each of the trellis symbols to determine a vector $y(n)$ associated with each of the trellis symbols.